grams per kilogram the proportion of abnormal fetuses was 78 percent; at 21.5 milligrams per kilogram it was 90 percent, and the proportion rose to 100 percent if a dosage of 46.4 milligrams per kilogram was administered between the 10th and the 15th days of pregnancy.

The study on the teratogenic effects of these compounds will be published in a few months. The study is said to need further statistical elaboration. D. W. Gaylor, a federal statistician who has examined the study, said in an interview that the teratogenic effects were "somewhat overstated on some compounds and understated on others."

Commenting on these studies, columnists Frank Mankiewicz and Tom Braden thundered: "Not since Romans salted the land after destroying Carthage has a nation taken pains to visit the war upon future generations." While such a statement may be an exaggeration (this observer does not believe that the U.S. government began use of 2,4,5-T and 2,4-D in Vietnam with the knowledge that they would have teratogenic effects in humans), the whole 2,4,5-T matter does raise important and unsettling questions to the scientists who have studied it. Why were these herbicides allowed to be widely used in Vietnam before scientific studies on animals had been performed? Why has Fort Detrick, the Army's biological and chemical warfare research center, failed to impose some control in the use of these herbicides?—BRYCE NELSON

A former member of the Science *news staff, Bryce Nelson is now a reporter for the national news staff of the Los Angeles* Times.

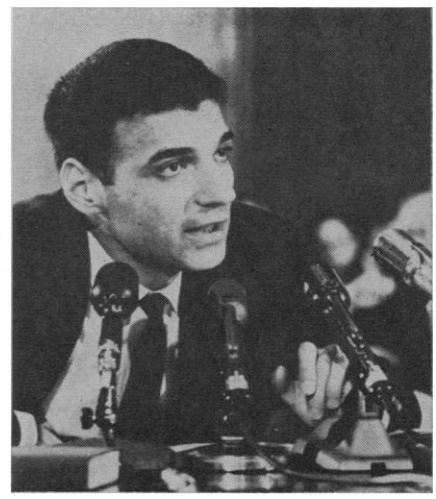
Nader: From Auto Safety to a Permanent Crusade

Five years ago Ralph Nader emerged from the obscurity of a Connecticut law firm to gain national prominence with a book, *Unsafe at Any Speed*, which challenged General Motors on the safety of one of its cars, the Corvair. In the ensuing years Nader has moved on from the issue of auto safety to become not only a champion of the American consumer but a forceful critic of traditional relations between industry and government. In Washington he has come to be regarded as a man on a permanent crusade.

Nader's *modus operandi* resembles that of the Washington lawyers whose objectives he often opposes. He is likely to consult scientific and technological sources as often as legal references in doing research, and he seldom if ever enters a courtroom. Nader has become a familiar figure at congressional hearings and has testified on such subjects as radiation health hazards, coal mine safety and health, and, fairly recently, the dangers of artificial food sweeteners, including cyclamates. His influence in persuading Congress to pass an auto safety bill and tougher amendments to federal meat inspection legislation is generally recognized. And his interest in federal regulatory agencies and the law firms which specialize in dealing with regulatory issues has made him the scourge of the bureaucracy.

Last year the Nader phenomenon proliferated when a group of students collaborated with Nader on a summer investigation of the Federal Trade Commission (FTC) and came up with a scathing critique of the policies and staff work of the agency, which Nader characterized as "the government's better business bureau." Interestingly, a task force of the American Bar Association appointed by President Nixon this spring arrived at a number of the same conclusions about the FTC.

This year the volunteer effort was institutionalized with the establishment of the Center for the Study of Responsive Law, in modest quarters near Dupont Circle in Washington. Nader recruited five young lawyers to serve as staff and this past summer enlisted about 100 students in law, medicine, and political science, called "Nader's raiders" by a friendly press, to help with the investigations. Five book-size reports are in the works and will be out in December in manuscript form. Among other topics, the books will explore what Nader calls the "Damon-and-Pythias relationship" between government and industry. Nader's group investigated primarily the Department of Agriculture's Pesticides Regulation Division, the Food and Drug Administration, the national air and water pollution control administrations, the Civil Aeronautics Board, and the Interstate Commerce Commission.



Ralph Nader

Although he is now the center of a group effort, Nader's style remains a highly personal one, which has changed little from his early days in Washington. Nader, who is 35, dislikes the idea that there is an entourage forming around him. His spartan mode of living is proverbial, and his investigative methods are carefully guarded. For example, he has made himself almost inaccessible, except by letter, to people wishing to see him. His phone numbers and office locations are known only to a few trusted friends. He takes pains to protect his sources, many of whom would suffer if they were identified. He refuses to discuss how or from whom he receives his information, but it is known that he gets tips from dissidents and from journalists to whom he may give leads for stories, and that he has access to a number of congressmen on Capitol Hill. It is well known that he has good rapport with senators Gaylord Nelson, George McGovern, Frank Moss, and Abraham Ribicoff, and with representatives Benjamin Rosenthal and

'MR. NADER! WHAT ARE YOU DOING IN THERE?'

Distributed by Los Angeles Times SYNDICATE

Kenneth Hechler. Nader's work has been likened to an iceberg: only a small part of it emerges above the surface. The bulk of his research is never visible to the public.

Washington tends to be cynical about reformers, and there is inevitably speculation about Nader's motives and aims. One of the Nader paradoxes is the fact that he makes adroit use of the press—he even finds it convenient to use a small office in the National Press Building—but shows no avidity for personal publicity. And, under intense observation, he retains a reputation as a kind of clear-headed Don Quixote.

His reforming zeal, in fact, seems to have been manifested early. As an undergraduate at Princeton in the 1950's he led a campaign to ban spraying of trees with pesticides, which he believed harmed campus birds. He was concerned with the problems of disadvantaged Indians when such concern was novel, and his interest in auto safety developed while he was still a student at Harvard Law School.

A Fastidious Researcher

Those familiar with Nader's activities during his years in Washington suggest that his success as a critic is due to his care with facts. He seems to be regarded by friends and even by the unfriendly as a thorough and fastidious researcher. "Everything that he's alleged to be fact has proven to be true," a staff member on McGovern's Senate subcommittee on nutrition told *Science*. A Washington newspaperman who often writes stories based on Nader's investigations for a Washington daily says, "You may disagree with Nader's interpretations and motives, but you can hardly dispute his facts."

To keep informed, Nader each week scans a wide variety of scientific research papers, government and industry studies, congressional documents, and periodicals ranging from *Science* to the *Ladies Home Journal*.

One lawyer at the Center told *Science* that Nader displays considerable ingenuity in obtaining his information. To get facts on the auto industry's attitude toward auto safety research, Nader went to the U.S. Patent Office, looked up the names of all the scientists and engineers who had invented safety devices that were not being used and called these individuals on the phone.

When he testifies before Congress, Nader generally backs up his allegations with scientific research data. For example, he based much of his last-year's testimony on the dangers of overexposure to x-radiation on the work of Karl Z. Morgan, director of health physics at the Oak Ridge National Laboratory. In preparing remarks on food contamination and sanitary conditions in fisheries he studied the work of John Nickerson of M.I.T. In his statements on earthquake hazards he quoted Peter A. Franken, a physics professor at the University of Michigan and former director of the Pentagon's Advanced Research Projects Agency.

Nader has many fans and allies on Capitol Hill who are quick to praise him. Rosenthal, a New York Democrat who is chairman of a special House subcommittee on consumer affairs, says, "Ralph Nader is first rate. He has done more for the consumer movement than the entire establishment together—even Congress can't break through the damn blue curtain of bureaucracy. . . . In terms of effectiveness, when you look at what he's done and what we Congressmen have done, the comparison is embarrassing." Linda Billings, a former member of Gaylord Nelson's staff, recalls working with Nader in 1964 "when he was a nobody" and when Nelson was introducing a bill on tire and auto safety standards. When Nader testified in 1967 before a small business subcommittee on the effects of monopoly conglomerates on society, Nelson commented, she recalls, that Nader's testimony was "far and away the most brilliant piece of writing he had ever seen on the subject."

However, some congressional staff members interviewed by *Science* say that Nader can appear intransigent and oblivious to political realities. A legislative assistant of a liberal, consumer-oriented congressman said Nader "is extremely influential in subcommittee and committee decisions." This same individual said, however, that Nader does not always seem to heed political realities. "He'll try to force you to do what he thinks is right," he said, "regardless of the political climate and implications." Staff members complain that he will call them at 3:00 in the morning to gather or relay information on short notice, and that he doesn't have a "good sense of political timing on some issues." Nader has also been criticized for spreading his efforts too thinly, in too many projects. Some congressional staff members find him compulsive, aggressive, and pushy. Others say that this is merely Nader's "overenthusiastic approach to things."

Appeal to Young People

If Nader's approach is too direct for some political pragmatists, it clearly appeals to young people concerned with consumer protection and environmental problems, as the recruiting of students for this past summer's campaign of Nader's raiders showed. While Nader does not work closely with any of them, the students identify with his ideals and guard against damaging his reputation for discretion and accuracy. Joe Tom Easley, a law student at the University of Texas, says, "Nader's one of the few heroes I've had who hasn't had feet of clay. He is extremely dedicated and has a finely attuned and finely honed sense of humor." Gisette Manero, a medical student at Syracuse, says that one of Nader's goals is getting

young professionals interested in championing social causes. "Ralph teaches you it pays to bother," she said. Jim Fallows, a senior at Harvard and president of the Harvard *Crimson*, described Nader as "dedicated" and his style as "low-keyed" and "above-board." Peter Gold, a second-year law student at New York University, says, "Nader is one of those rare people—he is what he appears to be. . . . He possesses an impeccable honesty and tremendous sincerity."

Politically, Nader is difficult to label. The students see him as "anti-status quo," but he fits the stereotype of neither the Old nor the New Left.

"Ralph is the most radical person I've ever met, because nothing is hallowed to him," Gold says. "The mere existence of an institution doesn't make it right. . . . Nader does not display his moral indignation in the streets because talking about fascist pigs is not his style. . . . While many radicals speak of revolution in terms of violent overthrow of the powers that be, Nader's dream is to have 10,000 professional persons in Washington to further public policy and to counteract the 15,000 lobbyists who work in Washington."

Opening "New Pathways"

In an interview, Nader told *Science* he believes his most significant contribution to date is the opening of "new pathways of policy impacts" so that lawyers and the public will "never again swallow the myth that the government is inaccessible and omnipotent." Nader says there is "too much Athens in present-day Washington." He deplores work in government departments, scholastic institutions, think tanks, and study groups that sacrifice action to academic study. He says such activities "lessen the sense of urgency and often delude persons into thinking they are acting."

Although Nader's colleagues say he relies quite heavily on scientific research for his investigations, Nader is sharply critical of the scientific community at large. He told *Science* that most scientists are divorced from the political and social implications of their research. Nader gets a large volume of mail, primarily from persons of the lower middle class with specific problems, but he gets very few letters from scientists. Most scientists, he says, suffer from a "syndrome" which allows them to "coolly assess" situations that cause others "to riot out of sheer indignation." Nader says the scientific community reacts too little and too late on such issues as the environmental hazards of the supersonic transport, underground atomic testing in Denver, the military's use of nerve gas, and pollution resulting from deep-well drilling operations. "Scientists," says Nader, "are not plugged into the power structure. . . . Scientists are not free. They have tremendous access to the press—almost as great as rioting students—but they don't use it." Nader is equally severe with his colleagues in the law profession. (He developed his thesis in an article on legal education and practices in the 11 October *New Republic*.)

Despite these hard words for the scientific community, scientific "inputs" appear to be, if anything, gaining in importance in Nader's work. Nader and his raiders pressed hard last summer to make known the suspected dangers of cyclamates and of another additive, monosodium glutamate, and strongly urged the government to take them off the market.

This year is the first time anyone of HEW Secretary Robert Finch's rank in government has officially recognized "brown lung" as a serious health threat, Nader says. In August, Nader sent Finch a letter urging him to initiate a thorough scientific study of byssinosis, a disease caused by breathing cotton dust, which afflicts Southern textile workers. Nader said that means of preventing the disease, including better filtering and exhaust equipment, are known and should be implemented. A number of weeks later Finch replied to Nader. He said that "brown lung" has been "too long ignored," and he urged that new legislation to help curb the disease be passed after studies are conducted. Nader's influence has also been felt in the White House. Two of his staff members recently participated in a White House panel on nutrition as invited representatives of the nation's consumers, so the impact of the Center and of the summer volunteers is beginning to register. Nader himself is a member of a federal advisory panel on auto safety.

Nader's Center has been described as a "congressional office in exile." Its aim, says Harrison Wellford, its executive director, "is to make law responsive to human needs by opening up the federal agencies to citizen participation." The Center is funded by a $91,000 grant, of which half came from the Carnegie Corporation and the other half from small foundations. The students, who earned, on the average, $600 for the summer, were paid out of Center funds or by donations from universities or private groups. (Nader's finances are completely independent of the Center. He supports himself through his lectures and writing.) About 40 percent of the more than 100 students working in the summer program were from the Boston area. The Medical Commission on Human Rights, a private professional group, sponsored 12 medical students and the University of Michigan sent three; other universities are being encouraged to set up cooperative programs. The Center was purposely organized so that its own bureaucracy would be kept to a minimum. Each of the five major project areas is managed by a different staff person, all of whom, Nader claims, operate independently of one another.

Corporations Criticized

What lies ahead for what might be called Nader, Inc.? Nader has not eased up in his investigations of industry. He continues to criticize industry for remaining rigidly content with "technological anachronisms," for product fixing, and for displaying a fear of innovations. He says that "silent violence" stems from corporate institutions that have "no moral and legal" responsibility to the man on the street. To remedy this lack of corporate responsibility, Nader suggests that corporation executives be held legally responsible as individuals for defective products, pollution, and other injustices to the public. He insists, also, that the public has a right to full disclosure of corporate activities.

Although Nader's interest in industry has not slackened, it is likely that he will continue to devote a good part of his attention to the regulatory agencies. A principal problem, he says, is the agencies' failure to shift the burden of proof for product safety and effectiveness to industry. Nader has recommended repeatedly at congressional hearings that the government, to assure safer, more effective products and fewer pollutants to the environment, establish tougher federal health and safety regulations. He also says the government should sponsor more research and more prototype de-

velopment to insure better products.

Besides the government regulatory agencies, Nader is also investigating the structure and nature of some of Washington's leading law firms. Nader has concentrated his initial efforts on the prestigious firm of Covington and Burling, which represents many large industries in cases involving the government. Nader says that such law firms, whose clients include trade associations and large corporations, are part of a "lobbying infrastructure" that often works to undermine the government's responsibilities to consumers by presenting only the industries' points of view.

Nader's raiders had some serious problems this past summer in obtaining information from the government for the Center's study. Before the summer ended, the group charged that some regulatory agencies had withheld information, given preferential treatment to special interest groups, and deliberately evaded the group's investigatory efforts by using a series of delaying tactics and attempting to snarl the investigators in red tape. At a press conference in August, Nader issued a report charging that the Freedom of Information Act, passed 2 years ago to provide for government disclosures to the public, "is being undermined by a riptide of bureaucratic ingenuity."

"The typical tactic is to delay replying for several weeks and then state that the request for information was

Senate Puts Pinch on "Pure" Science in Military Bill

Congress is taking an increasingly skeptical attitude toward Pentagon funding of "pure" science. Last week *Science* noted that the military procurement and research bill passed 6 November contains a sleeper (Section 203) which could, conceivably, end all military support of basic research, and which at least may portend some hostile investigations of selected research projects and institutions. (The section declares that Pentagon-backed research must have a "direct and apparent relationship to a specific military function or operation." *Science* 14 November.)

The same attitude shows up elsewhere in the military bill. For instance, no money is authorized for new starts under Project Themis, the 3-year-old attempt of the Defense Department to spread research funds around more broadly by sponsoring projects at universities which previously had done little or no federal research. The cutoff was sponsored by Senator J. W. Fulbright (D–Ark.) as part of his attempt to stem Pentagon support for science and foreign policy research. The practical effect is to put the future of Themis in doubt. When it was launched in 1966 under the care of John S. Foster, Jr., the director of research and engineering for the Department of Defense, the hope was to launch about 200 research projects over a 4-year period. But new starts were cut in half last year in an economy move by Foster. Defense officials say there are about 118 Themis projects at present, a number which will be gradually pruned back over the next year.

Congress cut $926 million from the Pentagon's $8.2 billion Research and Development budget. With a few exceptions, however, the Pentagon was not told where to make the 11-percent reductions. Basic and applied research projects are easier to trim than large engineering development efforts, according to officials in Foster's office. They predict that the research categories will thus probably have to absorb cuts of 15 percent or more.

Among the specified research and development cuts in the bill were the following:

- A cut of $10.5 million (11 percent) in research and development on biological and new chemical warfare agents and of delivery systems for disseminating lethal chemical and biological agents.
- A cut of $90 million in the "military sciences" grab bag of research carried out for the Defense agencies and military departments. This cut also would cover a $27 million (10 percent) reduction in funds for research carried out at the federal contract research centers, the termination of new starts for Project Themis, and other cuts directed by Fulbright in a Senate amendment 12 August (*Science* 22 August).

The Senate conferees sought without success to apply item-by-item reductions to the Research and Development budget. But, complained Senator Thomas J. McIntyre (D–N.H.) on 7 November, "lack of time, lack of staff, and lack of expertise pitted against the Pentagon's legions of experts [who were backed by the House conferees] frustrated our attempts." As a result of McIntyre's "unequal battle" with the Pentagon, the Senate Armed Services Committee may add several professional staff members to go over the R & D budget more carefully next year.

All things considered, including the climate on campuses, "it is going to be a really difficult year in this whole area" of academic research, according to John F. Morse, director of the Commission on Federal Relations of the American Council on Education.

But apart from the question of academic research for the military, the outcome of this year's "great debate" on the Pentagon was a letdown for those members of Congress who wish to curb the budgets and influence of the military. They were disappointed in the final version of the military procurement and research bill, which was weaker at several points than the Senate version. Restrictions on testing and transporting lethal chemical and biological weapons were relaxed (*Science* 14 November). The General Accounting Office was denied subpoena power for a study of defense industry profits, except selectively as authorized by the Armed Services Committees. Former military officers and Department of Defense officials doing business with the Government will have to file public reports, but in the final version of the bill they need not report what sort of work they are doing. The final version of the bill also left out a provision which would have required the General Accounting Office to make a quarterly review and report on major Defense contracts. Finally, no major weapons system sought by the Administration was cut back and, indeed, the bill authorized an extra $400 million for new ships not in the President's budget.—ANDREW HAMILTON

not specific enough," the report says. The report shows that information is sometimes classified as "under investigation" or as an "internal communication," to escape disclosure. The report also indicates that the agencies are inconsistent in providing information, and says that materials that were claimed to be exempt in one agency were given freely by another.

The report commends HEW's National Air Pollution Control Administration, calling it an exemplary agency which displayed "the most open position on information access." Nader's group rated the Federal Water Pollution Control Administration (FWPCA) and the Agriculture Department's Pesticide Regulation Division the two agencies least cooperative about providing information. Assistant Secretary Carl Klein in the Interior Department insisted that all interviews on water pollution be conducted in the presence of "monitors," the Nader group said. They call this an "obvious attempt to inhibit the freedom of speech rights of persons interviewed." The report also charges that the water pollution agency withheld unclassified information about sewage from military bases because "DOD is finicky" about releasing figures on total sewage. "Presumably the enemy could . . . rush back to its abacus and calculate the manpower strength of the base," it says. The report also indicates that the FWPCA denied access to copies of research proposals made to, but not accepted by, the water pollution agency. (The group says it wanted this information in order to assess the agency's research priorities to determine why certain proposals were turned down.) The report also charges that the Interior Department has been reluctant to make public a report it has been preparing on the harmful environmental effects of underground mining. The report gives details of similarly uncooperative acts by the Agriculture Department. The most "blatantly uncooperative" action, the group says, was taken by Pesticides Regulation Division director Harry Hays, who ordered general documents that were available to the public removed from the division's library after Nader's students began using them.

"There is little doubt that if government officials display as much imagination and initiative in administering their programs as they do in denying information about them, many national problems now in the grip of bureaucratic blight might become vulnerable to resolution," the report concludes.

Nader's work is reminiscent of that of the muckrakers in the early part of this century, whose efforts had a decisive impact on public policy. But, unlike most of the early reformers, Nader has not been content simply to be a critic. He has provided an example and a methodology and, in Washington, has himself become a formidable third force operating in behalf of his own clearly defined conception of the public interest.

—MARTI MUELLER

This article was researched and written by Marti Mueller, *a former member of the news staff with assistance on the final version by* John Walsh.

APPOINTMENTS

D. R. Corson

A. W. Cordier

Dale R. Corson, provost and chief administrative officer, Cornell University, to president of the university. . . . **Andrew W. Cordier**, acting president, Columbia University, appointed president. . . . **Roger L. Nichols**, associate professor of applied microbiology, Harvard University School of Public Health, to head, department of microbiology at the school. . . . **Gerald S. Marks**, professor of pharmacology, University of Alberta, to head, pharmacology department, Queen's University. . . . **Boyd Page**, vice president for research and dean, Graduate College, Iowa State University, to president, Council of Graduate Schools. . . . **J. Robert Buchanan**, acting dean, Cornell University Medical College, appointed dean. . . . **Jerold Roschwalb**, assistant director, division of fellowships of the endowment for the humanities, National Foundation on the Arts and Humanities, to executive director, American Association of State Colleges and Universities. . . . **Robert C. Cook**, past president, Population Reference Bureau, to population consultant, National Parks Association. . . . **Leonard J. Cole**, head, experimental pathology branch, U.S. Naval Radiological Defense Laboratory, to manager, immunobiology program, Stanford Research Institute. . . . **Geoffrey S. Watson**, chairman, statistics department, Johns Hopkins University, to chairman, statistics department, Princeton University. . . . **Ernest R. Sohns**, head, science information coordination section, Office of Science Information Service, NSF, to deputy head, Office of International Science Activities, NSF. . . . **Kenneth Purcell**, professor and director of clinical training, psychology department, University of Massachusetts, to chairman of the department. . . . **Stewart L. Udall**, former Secretary of the Interior, to chairman of the board, Overview Group, a private international consulting concern that works on environmental problems. . . . **Kathryn A. McCarthy**, professor of physics, Tufts University, to dean, graduate school of arts and sciences at the university. . . . **Lawrence A. Cremin**, professor of education, Teachers College, Columbia University, elected president, National Academy of Education. . . . **Mihran J. Ohanian**, associate professor of nuclear engineering, University of Florida, to chairman, department of nuclear engineering at the university. . . . **Alfred Nisonoff**, professor of microbiology, College of Medicine, University of Illinois, to chairman, department of biological chemistry at the medical school. . . . **Norman E. Chase**, professor of radiology, New York University School of Medicine, to chairman of the radiology department. . . . **Johannes H. B. Kemperman**, professor of mathematics, University of Rochester, to chairman, department of mathematics at the university. . . . **Finn J. Larsen**, principal deputy director of Defense Research and Engineering, to vice president for research, Toro Manufacturing Corp. and **Gardiner L. Tucker**, deputy director of Defense Research and Engineering for electronics and information systems, appointed principal deputy director of Defense Research and Engineering. . . . **Richard A. Matre**, dean, Graduate School, Loyola University, Chicago, Ill., to vice president and dean of faculties at the university. . . . **Thadis W. Box**, director, International Center for Arid and Semiarid Land Studies, Texas Technological College, to dean, College of Natural Resources, Utah State University.